

WHAT IS CLAIMED IS:

1. A dispersion compensator, comprising:

an optical component having an accumulated chromatic dispersion of -1200 ps/nm or more but less than -600 ps/nm
5 at a wavelength of 1.55 μm ; and

a housing having a volume of 500 cm^3 or less for accommodating said optical component.

2. A dispersion compensator according to claim 1,

wherein the volume V (cm^3) of said housing and the accumulated chromatic dispersion AD (ps/nm) of said optical component
10 satisfy the following relationship:

$$V \leq -0.31 \times AD + 120 .$$

3. An dispersion compensator according to claim 1,

further having, as a characteristic at the wavelength of
15 1.55 μm , an insertion loss of 5.9 dB or less.

4. A dispersion compensator according to claim 1,

wherein the insertion loss IL (dB) at the wavelength of 1.55 μm and the accumulated chromatic dispersion AD (ps/nm) of
said optical component satisfy the following relationship:

$$IL \leq -0.0033 \times AD + 1.9 .$$

5. A dispersion compensator according to claim 1,

wherein said optical component includes an optical fiber comprising:

a center core part extending along a predetermined axis

25 and having a predetermined maximum refractive index;

a first cladding part, provided on an outer periphery

of said center core part, having a refractive index lower than that of said center core part;

a second cladding part, provided on an outer periphery of said first cladding part, having a refractive index higher than that of said first cladding part; and

5 a third cladding part, provided on an outer periphery of said second cladding part, having a refractive index lower than that of said second cladding part.

6. A dispersion compensator according to claim 5,
10 further having, as a characteristic at the wavelength of
1.55 μm , a bending loss of 0.1 dB/km or less in a state wound
at a diameter of 60 mm.

7. A dispersion compensator according to claim 5,
15 wherein said second cladding part has a relative refractive index difference of 0.2% to 0.9% with reference to the refractive index of said cladding part; and

wherein said optical fiber satisfies the following conditions:

$$0.19 \leq a/c < 0.4, \text{ and}$$

$$20 \quad 0.4 \leq b/c \leq 0.8$$

where a is the outer radius of said center core region, b is the outer radius of said first cladding part, and c is the outer radius of said second cladding part.

8. A dispersion compensator, comprising:

25 an optical component having an accumulated chromatic dispersion of -600 ps/nm or more but less than -0 ps/nm at

a wavelength of 1.55 μm ; and

a housing having a volume of 310 cm^3 or less for accommodating said optical component.

9. A dispersion compensator according to claim 8,
5 wherein the volume V (cm^3) of said housing and the accumulated chromatic dispersion AD (ps/nm) of said optical component satisfy the following relationship:

$$V \leq -0.31 \times AD + 120 .$$

10 10. An dispersion compensator according to claim 8,
further having, as a characteristic at the wavelength of
1.55 μm , an insertion loss of 3.9 dB or less.

11. A dispersion compensator according to claim 8,
wherein the insertion loss IL (dB) at the wavelength of 1.55
 μm and the accumulated chromatic dispersion AD (ps/nm) of
15 said optical component satisfy the following relationship:

$$IL \leq -0.0033 \times AD + 1.9 .$$

12. A dispersion compensator according to claim 8,
wherein said optical component includes an optical fiber comprising:

20 a center core part extending along a predetermined axis and having a predetermined maximum refractive index;

a first cladding part, provided on an outer periphery of said center core part, having a refractive index lower than that of said center core part;

25 a second cladding part, provided on an outer periphery of said first cladding part, having a refractive index higher

than that of said first cladding part; and
a third cladding part, provided on an outer periphery
of said second cladding part, having a refractive index lower
than that of said second cladding part.

5 13. A dispersion compensator according to claim 12,
further having, as a characteristic at the wavelength of
1.55 μm , a bending loss of 0.1 dB/km or less in a state wound
at a diameter of 60 mm.

10 14. A dispersion compensator according to claim 12,
wherein said second cladding part has a relative refractive
index difference of 0.2% to 0.9% with reference to the
refractive index of said cladding part; and
wherein said optical fiber satisfies the following
conditions:

15 $0.19 \leq a/c < 0.4$, and

$0.4 \leq b/c \leq 0.8$

where a is the outer radius of said center core region, b
is the outer radius of said first cladding part, and c is
the outer radius of said second cladding part.

20 15. A dispersion compensator, comprising:

an optical component having an accumulated chromatic
dispersion of -300 ps/nm or more but less than -0 ps/nm at
a wavelength of 1.55 μm ; and

25 a housing having a volume of 260 cm^3 or less for
accommodating said optical component.

16. A dispersion compensator according to claim 15,

wherein the volume V (cm^3) of said housing and the accumulated chromatic dispersion AD (ps/nm) of said optical component satisfy the following relationship:

$$V \leq -0.31 \times AD + 120 .$$

5 17. An dispersion compensator according to claim 15, further having, as a characteristic at the wavelength of 1.55 μm , an insertion loss of 2.9 dB or less.

10 18. A dispersion compensator according to claim 15, wherein the insertion loss IL (dB) at the wavelength of 1.55 μm and the accumulated chromatic dispersion AD (ps/nm) of said optical component satisfy the following relationship:

$$IL \leq -0.0033 \times AD + 1.9 .$$

15 19. A dispersion compensator according to claim 15, wherein said optical component includes an optical fiber comprising:

a center core part extending along a predetermined axis and having a predetermined maximum refractive index;

20 a first cladding part, provided on an outer periphery of said center core part, having a refractive index lower than that of said center core part;

a second cladding part, provided on an outer periphery of said first cladding part, having a refractive index higher than that of said first cladding part; and

25 a third cladding part, provided on an outer periphery of said second cladding part, having a refractive index lower than that of said second cladding part.

20. A dispersion compensator according to claim 19,
further having, as a characteristic at the wavelength of
1.55 μm , a bending loss of 0.1 dB/km or less in a state wound
at a diameter of 60 mm.

5 21. A dispersion compensator according to claim 19,
wherein said second cladding part has a relative refractive
index difference of 0.2% to 0.9% with reference to the
refractive index of said cladding part; and

10 wherein said optical fiber satisfies the following
conditions:

$$0.19 \leq a/c < 0.4, \text{ and}$$

$$0.4 \leq b/c \leq 0.8$$

15 where a is the outer radius of said center core region, b
is the outer radius of said first cladding part, and c is
the outer radius of said second cladding part.

22. A dispersion compensator, comprising:

an optical component having an accumulated chromatic
dispersion of -180 ps/nm or more but less than -0 ps/nm at
a wavelength of 1.55 μm ; and

20 a housing having a volume of 200 cm^3 or less for
accommodating said optical component.

25 23. A dispersion compensator according to claim 22,
wherein the volume V (cm^3) of said housing and the accumulated
chromatic dispersion AD (ps/nm) of said optical component
satisfy the following relationship:

$$V \leq -0.31 \times AD + 120 .$$

24. An dispersion compensator according to claim 22,
further having, as a characteristic at the wavelength of
1.55 μm , an insertion loss of 2.5 dB or less.

5 25. A dispersion compensator according to claim 22,
wherein the insertion loss IL (dB) at the wavelength of 1.55
 μm and the accumulated chromatic dispersion AD (ps/nm) of
said optical component satisfy the following relationship:

$$\text{IL} \leq -0.0033 \times \text{AD} + 1.9 .$$

10 26. A dispersion compensator according to claim 22,
wherein said optical component includes an optical fiber
comprising:

a center core part extending along a predetermined axis
and having a predetermined maximum refractive index;

15 a first cladding part, provided on an outer periphery
of said center core part, having a refractive index lower
than that of said center core part;

a second cladding part, provided on an outer periphery
of said first cladding part, having a refractive index higher
than that of said first cladding part; and

20 a third cladding part, provided on an outer periphery
of said second cladding part, having a refractive index lower
than that of said second cladding part.

25 27. A dispersion compensator according to claim 26,
further having, as a characteristic at the wavelength of
1.55 μm , a bending loss of 0.1 dB/km or less in a state wound
at a diameter of 60 mm.

28. A dispersion compensator according to claim 26, wherein said second cladding part has a relative refractive index difference of 0.2% to 0.9% with reference to the refractive index of said cladding part; and

5 wherein said optical fiber satisfies the following conditions:

$$0.19 \leq a/c < 0.4, \text{ and}$$

$$0.4 \leq b/c \leq 0.8$$

10 where a is the outer radius of said center core region, b is the outer radius of said first cladding part, and c is the outer radius of said second cladding part.

29. A dispersion compensator, comprising:

an optical component having a predetermined accumulated chromatic dispersion at a wavelength of 1.55 μm ; and

a housing for accommodating said optical component, wherein the volume V (cm^3) of said housing and the accumulated chromatic dispersion AD (ps/nm) of said optical component satisfy the following relationship:

$$V \leq -0.31 \times AD + 120 .$$

30. A dispersion compensator according to claim 29, wherein the insertion loss IL (dB) at the wavelength of 1.55 μm and the accumulated chromatic dispersion AD (ps/nm) of said optical component satisfy the following relationship:

$$IL \leq -0.0033 \times AD + 1.9 .$$

31. A dispersion compensator according to claim 29,

wherein said optical component includes an optical fiber comprising:

a center core part extending along a predetermined axis and having a predetermined maximum refractive index;

5 a first cladding part, provided on an outer periphery of said center core part, having a refractive index lower than that of said center core part;

10 a second cladding part, provided on an outer periphery of said first cladding part, having a refractive index higher than that of said first cladding part; and

a third cladding part, provided on an outer periphery of said second cladding part, having a refractive index lower than that of said second cladding part.

32. A dispersion compensator according to claim 31, further having, as a characteristic at the wavelength of 1.55 μm , a bending loss of 0.1 dB/km or less in a state wound at a diameter of 60 mm.

15 33. A dispersion compensator according to claim 29, wherein said second cladding part has a relative refractive index difference of 0.2% to 0.9% with reference to the refractive index of said cladding part; and

20 wherein said optical fiber satisfies the following conditions:

$$0.19 \leq a/c < 0.4, \text{ and}$$

$$0.4 \leq b/c \leq 0.8$$

25 where a is the outer radius of said center core region, b

is the outer radius of said first cladding part, and c is the outer radius of said second cladding part.